SPECIFICATION AMENDMENTS

Please amend the paragraph on Page 7, lines 5 – 22, as follows:

In a further aspect, the invention provides ~~and~~ an integrated circuit comprising a thin film of metal oxide material; and a hydrogen barrier layer located to inhibit the diffusion of hydrogen to the metal oxide material, the hydrogen barrier layer comprising a primary hydrogen barrier layer material and a supplemental hydrogen barrier layer material, the primary hydrogen barrier layer material being different than the supplemental hydrogen barrier layer material, and wherein the primary and supplemental materials are either both conducting or both insulating. Preferably, the supplemental material is located in contact with the primary material. Preferably, the primary material and the secondary material are both conducting. Preferably, the primary material and the secondary material are both insulating. Preferably, the primary material is more compatible with the metal oxide material and is located closer to the metal oxide material. Preferably, the primary material comprises one of the chemical elements that is in the metal oxide material. Preferably, the metal oxide material is a layered superlattice material. Preferably, the primary material comprises material selected from the group consisting of: strontium tantalate, bismuth tantalate, tantalum oxide, titanium oxide, zirconium oxide, and aluminum oxide. Preferably, the supplemental material comprises a material selected from the group consisting of silicon nitride and ~~allumina~~ alumina.

Please amend the formula on Page 14, line 14, as follows:

(1) $A1_{w1}^{+a1}A2_{w2}^{+a2}\ldots Aj_{wj}^{+aj}S1_{x1}^{+s1}S2_{x2}^{+x2}\ldots Sk_{xk}^{+sk}B1_{y1}^{+b1}B2_{y2}^{+b2}\ldots Bl_{yl}^{+bl}Q_z^{[-2]q}$,

Please amend the paragraph on Page 17, lines 7 – 22, as follows:

FIG. 4 also illustrates another feature of the invention; namely, that hydrogen barrier layer 227 is a multiple layer barrier, and that it comprises supplemental hydrogen barrier layer 229 adjacent primary barrier layer 230. Supplemental hydrogen barrier layer 229 is made of a different material than barrier layer 230. Preferably, it is made of a dielectric material, and most preferably silicon nitride or ~~allumina~~ alumina, but may be any other material that is useful as a hydrogen barrier layer. In one embodiment, the primary barrier layer is amorphous and the supplemental barrier layer is crystalline, preferably the

crystalline form of the material of which the primary layer is made. The use of a multiple layer hydrogen barrier has many advantages. It permits a supplemental hydrogen barrier layer 229 that is not fully compatible chemically with the materials of capacitor 226, and in particular metal oxide 216, to be used, because primary barrier layer 230, which is highly compatible chemically with capacitor 226, and in particular metal oxide 216, screens supplemental barrier layer 229 from direct contact with capacitor 226, and in particular metal oxide 216. It also creates an interface 231 between two dissimilar hydrogen barrier layer materials, which interface is a highly effective trapping site for hydrogen.

Please amend the paragraph on Page 17, line 23 – Page 18, line 16, as follows:

A second interlayer dielectric, ILD 246, covers ILD 186 and MFM capacitor 226. A wiring hole 194 extends through ILD 246 and ILD 186 to gate electrode 196. Wiring hole 232 extends through ILD 246 to upper surface 236 of bottom electrode 234. Local interconnect 238 fills wiring holes 194, 232 and electrically connects gate electrode 196 and bottom electrode 234. A wiring hole 224 extends through ILD 246 to conducting hydrogen barrier layer 228. Local interconnect 220 fills wiring hole 224, electrically connecting conducting hydrogen barrier layer 228 to a write-voltage (not shown). A wiring hole 240 extends through ILD 246 and ILD 206 to drain region 188. Local interconnect 242 fills wiring hole 220 and electrically connects drain region 188 to a read-voltage and a source-to-drain current sensor (not shown). Source region 208 is connected to a voltage source (not shown) either through patterning of doped area 208 in substrate 202 or by way of a local interconnect (not shown). After the formation of the wiring layer interconnects, a second insulating hydrogen barrier layer 250 is preferably formed. This hydrogen barrier layer 250 is preferably a multiple layer hydrogen barrier layer, comprising a primary hydrogen barrier layer 248 and supplemental hydrogen barrier layer 249, having an interface 251. Primary barrier layer 249 is preferably is made of at least one chemical compound selected from the group consisting of strontium tantalate, bismuth tantalate, and tantalum oxide. Supplemental hydrogen barrier layer 249 is preferably made of silicon nitride or ~~allumina~~ <u>alumina</u>, but may be made of any other dielectric material that is compatible with ILD 212 and primary barrier layer 248, and capable of forming an interface

251. In one embodiment, the primary barrier layer is amorphous and the supplemental barrier layer is crystalline, preferably the crystalline form of the material of which the primary layer is made. Other wiring layers and a capping layer 212 are deposited as known in the art to complete the integrated circuit.

Please amend the paragraph on Page 20, line 12 – Page 21, line 13, as follows:

FIG. 7 shows a MFMISFET 400 that includes a polysilicon layer 390 between electrode 392 and insulating layer 388. This FET is again formed on a semiconductor 380, and includes source/drains 382 and 386, channel 384, hydrogen barrier layer 391, metal oxide 396, and bottom electrode 392. Preferably, metal oxide 396 is ferroelectric, making structure 400 a ferroelectric field effect transistor. Hydrogen barrier layer 391 preferably comprises a multilayer barrier layer and includes primary barrier layer 395 and supplemental barrier layer 393. Both layers 393 and 395 are preferably conducting, but one or both may be insulating. As indicated above, the use of a multiple layer hydrogen barrier has many advantages. It permits a supplemental hydrogen barrier layer 393 that is not fully compatible chemically with the materials of metal oxide 396[,] to be used, because primary barrier layer 395, which is highly compatible chemically with metal oxide 396, screens supplemental barrier layer 393 from direct contact with metal oxide 396. It also permits the use of a supplemental barrier layer 393 that is more compatible with electrode 392 and the layers below it, such as polysilicon. It further creates an interface 231 between two dissimilar hydrogen barrier layer materials, which interface is a highly effective trapping site for hydrogen. The embodiment of FIG. 7 is also shown with linear, or MIS, capacitor 410 formed by polysilicon layer 390, insulator 388, and channel 384, having a larger area than metal oxide capacitor 408, which is sometimes referred to as a MFIM capacitor 408 when metal oxide 396 is ferroelectric. In this embodiment, electrode 392 is shown having the area of metal oxide capacitor 408, although it also could have the area of insulator capacitor 410. Insulating hydrogen barrier layer 406 and hydrogen barrier layer 391 preferably enclose metal oxide 396, though not all of these layers may be used. Insulating hydrogen barrier layer 406 preferably directly contacts top electrode 398, metal oxide 396, hydrogen barrier layer 391, and bottom electrode 392. Insulating hydrog n

barrier layer 406, and primary hydrogen barrier layer 395, if it is insulating, preferably comprises at least one chemical compound selected from the group consisting of strontium tantalate, bismuth tantalate, and tantalum oxide. Layer ~~394~~ 391, if it is conducting, comprises one of the conducting barrier materials discussed above. The composition of metal oxide layer 396 is discussed in detail above. In this embodiment, gate electrode 398 extends into the paper and electrical connection is made to it in a manner similar to the manner in which electrical connection is made to word lines in the prior art.